d.) Remarks

In the instant Action a primary reference in the rejections under §102 and §103 is the Yamakawa patent, which discloses a method for recognizing handwritten characters input into an electronic device. Yamakawa's approach to character recognition is fundamentally based in vector processing. In a first method, it describes recording each stroke of a character and deriving start-end data and determining transition strokes that extend virtually between the end of any one stroke and the start of the next stroke. This data is then compared to a dictionary of ordinary strokes, start-end strokes and transition strokes to determine a recognizable character. This approach bears no similarity to the present invention.

In further techniques, Yamakawa describes that each input stroke is broken down into component vectors, and the virtual transition strokes may also be reduced to component vectors, after which the vector information is reduced to fuzzy vectors. Here it is important to note that the number of component vectors is limited in the Yamakawa system. As noted in col. 5, lines 25-30, " In the system employing the fuzzy vector, since the total number of the "component vectors" is the smallest number of units representing the trajectory of handwriting in forming a handwritten character, a number greater than the number of strokes of the handwritten character is required for extracting information of the trajectory of handwriting therefrom." Note also col. 5, lines 39-43: "That is, the number of the component vectors is not changed by the length of the total strokes, but

the number of the component vectors per one stroke is univocally (sic) determined by the number of strokes." Thus the longer the stroke (or combination of strokes), the greater the spacing of points in Yamakawa and the less accurate is the analysis.

It must be emphasized that the use of transition strokes, the use of vectors, the limitations on the number of vectors (comparable to, in the present invention, the number of data points or slice calculations), or the limitation of vector numbers based on the number of strokes in a character, are all concepts that are completely antithetical to the techniques described and claimed in the present invention.

In the instant invention, the stroke of a hand drawn input is broken down into slices of sequences of three serial points that are spaced apart greater than a minimum distance, and each slice is analyzed to determine its angle. <u>There is no limitation to the number of slices that are processed</u>. The sequential slice angles are analyzed to determine the presence or absence of an angular trend in the stroke, and to determine the presence or absence of a vertex. There is no actual determination of vertices or angular trends in Yamakawa; instead, the reference resorts to 'fuzzy vectors', which are best understood as broad categorizations of the angular relationships between the adjacent limited number of component vectors of Yamakawa. The fuzzy vectors are integers that describe the component vector changes only

according to which Cartesian quadrant the change is pointing toward, and thus provides no more angular resolution than ±90°. This technique cannot determine the presence or location of a vertex. Rather, the fuzzy vector information is compared to a dictionary of fuzzy vector patterns that correlate with known characters.

In the instant Action, Yamakawa Figure 9 is cited as a teaching of the step of determining the distances between identified vertices. First of all, Yamakawa does not identify vertices in the drawn input. Secondly, Figure 9 merely shows the construction of a component vector between two adjacent points on a drawn input. The two points are not necessarily vertices, and, in fact, would be vertices only by rare coincidence.

In the instant Action, Figures 7-9 of Yamakawa are cited as showing of the Wide Pen test of the present invention. There is absolutely no description or basis in Yamakawa to support an interpretation of a teaching of a Wide Pen test. Figures 7-9 of this reference depict vector processing (component vectors between the limited number of points in a stroke input). In contradistinction, the Wide Pen test involves comparing a drawn input to a known figure rendered in a wide line by, in effect, superposing the input over the known figure to determine if the points of the drawn input fall within the wide line of the known figure. There is no such teaching in Yamakawa.

The instant Action also cites the Abstract of Yamakawa as a teaching of arrow logics. In the present application, Arrow Logics is defined (page 13) clearly as the use of hand drawn arrows to "designate links between any graphic object or group of objects and any other graphic object or group of objects. These links are user-definable and can represent actions, functions, definitions and the like. A single hand drawn arrow graphic can be used to cause virtually any function, action, definition, assignment, etc. that is possible on a given system...." There is absolutely no teaching of this concept in Yamakawa.

Nor does Yamakawa teach the concept of generating a bounding rectangle for a hand drawn input, generating an identifiable geometric shape using a wide pen line within the rectangle, and comparing the coincidence of points of the drawn input with the geometric shape. Figures 7 and 8 show a series of data points within a rectangle, but there is no disclosure that this a bounding rectangle, nor that the rectangle is related to the size of the drawn input, nor of any use made of a bounding rectangle in identifying a hand drawn input.

The Capps reference, originally cited by applicant, describes a far different approach to hand drawn stroke identification. Although Capps does detect any onscreen object in close proximity to the drawn scrubbing gesture, the rejection under §103 is factually inaccurate in concluding that Capps agglomerates two or more drawn inputs to form a new, single input. Rather, Capps merely detects if the scrubbing gesture (an erasure command) is close enough to a selected object to command the erasure of that proximate object. It does NOT add together two or more drawn inputs to create an agglomerated input. Thus the rejection of claim

16, based in part on Capps is without any factual foundation.

Regarding claim 9, the rejection cites Capps col. 12, lines 59-61 as a teaching of the use of color to determine agglomeration of two or more drawn inputs. This citation is erroneous. Indeed, a word search of the Capps patent reveals not one instance of the word "color". This rejection should be withdrawn.

Regarding the rejection of claims 15 and 17, Capps does generate a bounding rectangle, as shown in Figure 14 of the reference. However, this bounding rectangle is not used in any way for stroke analysis. Rather, the bounding box is used to locate the sequential frames of a brief animation that graphically demonstrates the erasure of an object from the display. There is no basis for assuming that the Capps bounding box bears any relationship to stroke analysis.

Concerning claim 19, which relates to the Wide Pen test of the present invention, the rejection cites Capps col. 10, lines 6-21 as a showing of adaptively altering the width of the pen stroke in the Wide Pen test. Capps does not have any such showing of a Wide Pen test, nor of adaptively altering a pen stroke for analysis and identification purposes. The citation relates to reducing the number of line segments by removing segments that are shorter than a predetermined LENGTH threshold, and then eliminating corners that are less than a predetermined ANGLE. There is no disclosure regarding pen WIDTH, nor of determining the coincidence of points of a drawn input to a machine-rendered regular figure drawn in a wide pen line. This rejection is without factual foundation and should be withdrawn.

Regarding claim 20, Capps col. 11, lines 15-26 is cited as a showing of

analysis by determining coincidence of the drawn input with an identifiable geometric shape (the Wide Pen test). This rejection is completely unsupported by the facts. The Capps citation relates to an analysis technique in which the drawn input is processed to find corner points by first drawing an imaginary straight line between the first and last points of the input, and then finding the farthest point on the drawn input from the imaginary line. If the farthest point is more than a predetermined distance from the imaginary line, it is defined as a corner point. The process is reiterated until a set of processed points is developed and none of the actual points on the input stroke are farther that the predetermined distance from the imaginary line. Not only is this technique not used in any way in the present invention, it is clear that this technique is in no way similar to the Wide Pen test described in the present application and set forth in claim 20. This rejection is completely unsupported by the reference, and cannot be maintained.

Claim 21 depends from claim 20, and further states that the degree of coincidence between the Wide Pen figure and the drawn input may be adaptively altered to analyze the input. Although Capps teaches varying the predetermined offset distance between the imaginary line and the drawn input, Capps is not applying a coincidence test, and there is no teaching in Capps of varying the degree of coincidence in a Wide Pen test. The application of the Capps teaching here is completely inapt and unobvious.

The rejection of claim 22 refers back to the previous rejection of claim 13. However, the rejection of claim 13 is based solely on Yamakawa, so there is no actual statement of how Capps might be combined with Yamakawa to reject claim

22. Thus no rejection of claim 22 under §103 has been stated.

Regarding the rejections of claim 23 and 95, Capps Figures 3A-3E are cited to show the step of drawing at least one arrow from an attribute shown in an info window to at least one identified shape outside said info window. These figures make no such showing. Rather, Figures 3A-3E depict a scrub (erasure) gesture drawn over a sentence of text, or one side of a graphic object, or the vertex of a graphic object, or a caret gesture made between two characters of text, or an open space gesture made between two lines of text (col. 3, lines 28-38). Although the graphic object depicted is an arrow, this arrow has absolutely no function (programming or otherwise) other than passively receiving the scrub gesture. It does not convey any attribute from an info window to an identified shape outside the info window, as set forth in claim 23. The rejection of claim 23 is completely unsupported by the citation.

The rejection of claim 27 cites Capps Figure 6, element 170 to allegedly show the step of excluding identification of shapes that do not conform to a set of rules regarding maximum proximate distance to another graphic object. As noted previously, Capps determines proximity of a drawn input to a graphic object only to determine if the drawn object's function (scrub, caret, space, etc.) should be applied to the graphic object. There is no teaching of using the proximity determination as an aide in analysis and identification. Moreover, element 170 of Capps refers to the analysis technique reviewed above in which corner points in the drawn input are identified if their distance from the start-end imaginary line exceeds a predetermined minimum. This teaching in no way approaches the literal

language of claim 27.

Regarding the rejection of claim 50, applicant finds no citation in Capps "where numeric information can be entered into the pen-based computer system." Nor is there any discussion of magic number values in either reference.

Regarding the rejection of claim 96, Capps col. 1, lines 47-49 , and col. 14, lines 3-33 are cited to show that "the maximum total reduction of said predetermined angle threshold is determined by a user-defined parameter." Neither citation has any bearing on this recitation. Col. 1, lines 47-49 merely refers to the ability to enter text and numeric info using the pen and screen if there is suitable recognition software. Col. 14, lines 3-33 describes in detail the determination of turn angle, but there is NO mention of determination by a user-defined parameter.

Claims 29-46 stand rejected under §103 over the combination of Yamakawa and Meeks. Meeks describes a method for displaying handwriting in which the linear speed of the writing pen is graphically portrayed by varying the thickness of the drawn line. It explains that an original signature thus displayed may be distinguished from a forgery by comparing the line thicknesses and pauses, based on the premise that the forger cannot mimic the speed and pauses of the original. It is significant to note that <u>Meeks does not describe any technique nor methodology for analyzing or identifying a hand drawn entry</u>, other than visual inspection by a person. There is no teaching of machine methods or procedures for determining the meaning of a hand drawn input. There is no teaching of how the display techniques of Meeks could be combined with the vector processing schemes of Yamakawa, nor any suggestion to do so.

For the record, claim 29 and its depend claims 30-37 cover the concept of identifying a portion of a hand drawn entry more slowly than other portions of the entry. Claims 38-43 are not dependent from claim 29 and do not contain any limitation regarding speed of identification. The citation of Meeks against these claims is not appropriate.

Regarding claim 30, which recites the step of determining the existence of a vertex in the portion of the entry that is analyzed more slowly, the rejection points to Yamakawa Figures 9 and 10. However, as discussed previously, Yamakawa uses a vector processing scheme which constructs component vectors between a limited number of adjacent points, and then reduces the component vectors to "fuzzy vectors", which are integer numbers that describe the Cartesian quadrant toward which the component vectors are pointing. The fuzzy vector numbers are then compared to a dictionary that correlates these numbers with known figures. The actual vertex angle is never calculated.

Moreover, the present invention makes clear in its disclosure that the slowly analyzed portion is generally the initial portion of the drawn input, based on the observation that the initial portion is typically drawn more carefully, with more precise angles (orthogonal for rectangular objects, acute for triangles, etc.), and the end of the stroke is typically more casually or sloppily drawn. This concept is completely lacking in the cited art.

Likewise, with regard to claims 32 and 35, Yamakawa does not employ the golden clue concept, wherein if a vertex angle in the portion of said hand drawn entry is substantially orthogonal, the golden clue test provides increased potential

for identifying a rectilinear shape. The fuzzy vector technique of Yamakawa cannot accomplish the golden clue test, since it does not identify an orthogonal vertex. The same is true of claims 33, 34, 36 and 37, where the identified vertex angle may increase the potential for recognition or be used to increase the potential to exclude some shapes.

Claims 38-41 depend from claim 1 and recite the slice analysis technique of the invention. Claim 38 recites the process of "identifying three of said points that are adjacent and spaced apart greater than a minimum pixel length distance, constructing an angle defined by said three points, measuring the constructed angle, and reiterating said slice step in serial fashion with consecutive points of said hand drawn entry to include substantially all said points of said hand drawn entry." As described above, Yamakawa uses a vector process that does not process substantially all the points of the drawn entry. Rather, it *a priori* limits drastically the number of points to process in accordance with the number of strokes to approximately 32, which is typically thousands of times less than the number of points processed in the claimed invention. Moreover, Yamakawa does not process accumulated angle information to determine curvature of the line, nor does it determine the presence of vertices, particularly when the drawn line does not form a clear vertex (abrupt turning point). The rejection points to col. 7, lines 25-67 of Yamakawa, which details how the absolute angles of the component vectors are subsequently reduced to fuzzy vectors. As noted above, the fuzzy vectors are low order integers that represent the grossest approximation of the directions of the component vectors from which they are derived. These fuzzy

vectors are then compared to a dictionary of symbols; they are NOT further processed to identify vertices, determine angular trend, or any other process that is employed in the present invention. Only the slice processing techniques of the present invention can accomplish these tasks, and then use the results to identify the drawn figure with a very high degree of accuracy. Claims 38-41 set forth this process, and, finding no counterpart in the prior art, define patentable subject matter.

The claims have been substantially amended to particularly point out the manifest distinctions of the invention over the cited art. It is asserted that all claims now presented are allowable, and the application is in condition to be passed to issue. Action toward that end is earnestly solicited.

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